corresponding metadata and might further request that the metadata be cast along with the content. The details of the casting module will be described in more detail below.

Like non-live content, live content, such as a live video feed, must also be uploaded to the DDS. In the case of live content the SS may cause a message such as:

> "Live broadcast of content for distribution #123456 will occur Aug. 17th 2002 @ 14:14:00. Failure to meet this deadline may result in reassignment of bandwidth"

to be displayed upon the content provider software. For live content, such a message acts as a reminder of sorts since for live content upload time is equal to the transition time.

At some time prior to the transmission time, the scheduler intelligence module may send to the preprocessor module a message including the unique identifier corresponding to the distribution, the rate at which transmission over the wireless link will occur and, in some embodiments, the metadata relating to the distribution. The preprocessor module stores the received information in a related temporary store.

At the transmission time, the content provider software begins to accept input of the streaming media. The content provider software might receive the input, for example, by making use of APIs or frameworks which allow for capture of audio and/or video from interfaces located on the computer running the content provider software. The interfaces may include, for example, Firewire ports, line-level analog audio input ports, and NTSC or PAL analog video input ports. After each capture of a certain number of time units of audio or video (e.g., a certain number of frames of a video program), the content provider software may send a message to the preprocessor module 809. The message may include the unique identifier corresponding to the content, the freshly-captured video and/or audio segments, and a request for preprocessing of the segments. In cases where a VPN is not used to connect the content provider to the preprocessor

module, the content provider software may first need to interface with a gatekeeper module as described above.

In response to the message, the preprocessor module may perform preprocessing of the segments in a matter analogous to that described above in relation to non-live content. The preprocessor module may further determine from the previously received corresponding metadata whether the content is for global distribution or for distribution to a particular network area. Based on the determination, the preprocessor module may send a message to the appropriate caster, the message including the segments to be cast, an indication of the rate at which transmission over the wireless link should occur, and a request that the segments be cast with the goal of performing transmission at the specified rate. In some embodiments the message might periodically further include the corresponding metadata and might further request that the metadata be cast along with the segments.

Casting, Brokering, and Transmission over the Wireless Link

As noted previously, the DDS of the present invention allows a content provider to specify, in metadata for example, that a particular distribution be a "global" distribution, that is one which is transmitted over the wireless link to all network areas, or that a particular distribution be a "local" distribution, that is one which is transmitted only to certain network areas. Content to be distributed is routed to either a global caster module or to a local caster module based on this specification.

As can be seen in Fig. 8, there is for each network area a broker module that receives messages from both a global caster module and the local caster module corresponding that area. For example, the broker module for area 1 (829) receives messages from global caster module 821 and the local caster module for area 1 (819). The broker module, in turn, sends

messages to at least one multiprotocol encapsulation (MPE) module that is associated with wireless transmission equipment that serves that the broker's network area. For example, the broker module for area 1 (829) sends messages to the MPE module for area 1 (831). In cases where a network area comprises more than one cell, there is preferably an MPE module and transmitter for each cell.

Upon receipt of a casting message, the global caster object sends to each broker object a message including the metadata and/or content sent to it in the casting message, the message further requesting the transmission of that content and/or metadata. If a transmission rate was included in the casting message, the global caster object would request that the transmission occur at this rate. On the other hand a local caster module, upon receipt of a casting message, sends a message to its corresponding local broker module including the metadata and/or content sent to it in the casting message, the message further requesting the transmission of that content and/or metadata. For example, the local caster module for network area #2 would send to the broker for network area #2 a message requesting transmission. As above, if a transmission rate was included in the casting message, the local caster object would request that the transmission occur at this rate.

As alluded to above, the global caster object is required to send its message requesting transmission to a plurality of broker objects, one for each network area. One way to implement this is for the global caster object to keep track of all of the network area broker objects and send a message to each one in succession. Thus, for example, a message would be sent to the broker for network area 1 (829), then the broker for network area 2 (823), and so on. Alternately, a publish-subscribe messaging scheme may be used. For example, when using the Apple Computer Cocoa frameworks, the global caster object may, instead of passing a message to each local area broker, formulate the message into a NSNotification and send it to an